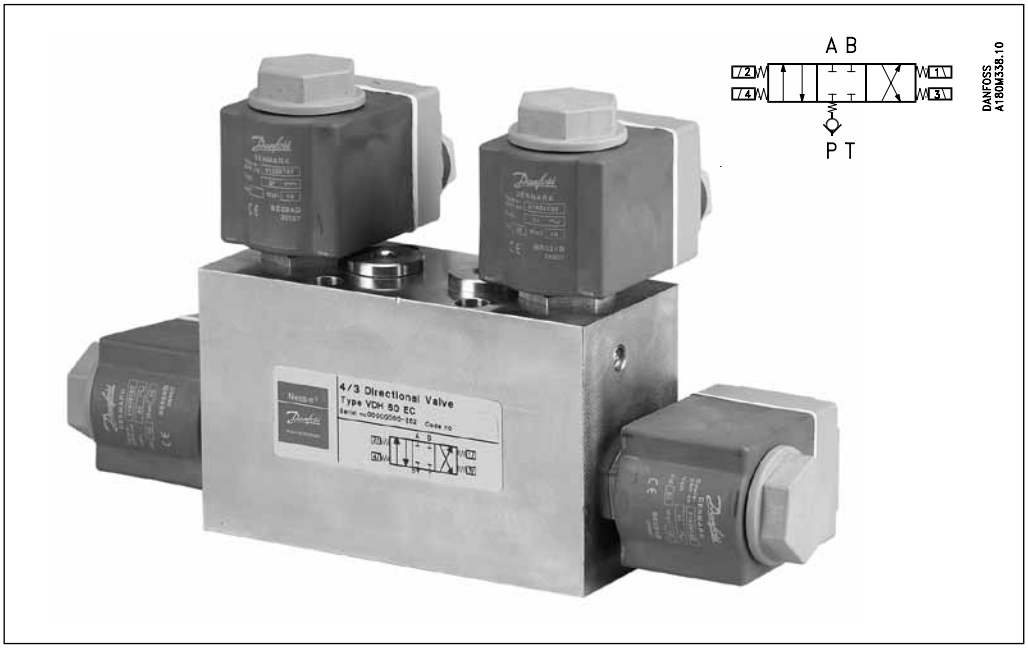
Directional Control Valve type VDH 60EC 4/3

For Cetop 5 flange mounting (ISO 4401) and inline mounting



Applications

Directional valves are used to control the direction of water flow.
The valves are designed for tap water, i.e. without additives. (EU-Directive 98/83/EC).

Function

The directional valves are pilot operated On/Off seat valves electrically activated by 4 coils.
The valves are designed according to the seat valve principle where each individual seat valve is controlled by its own pilot stage.

This valve type contains 4 seat valves altogether: two inlet valves and two outlet valves. As each seat valve is individually controlled by its own pilot, this design offers many different valve configurations to the end user.

Advantages

- Installable on all Cetop 5 blocks and inline blocks
- Corrosion resistant materials
- Easy-to-clean surfaces
- The seat valve design ensures minimum leakage
- High degree of enclosure, IP 67
- Many valve configurations available

Variants

The valve housing comes in the standard version in stainless steel AISI 304 or AISI 316.

The valve is available as a Normally Closed valve (NC) or in a combination of Normally Open (NO) and Normally Closed (NC).

Filtration

The water supply must be filtered through a 10 µm abs., $ß_{10}$-value > 5000 filter.

For further filter details, please contact the Danfoss Sales Organization.

Technical data

Max. pressure port P, A and B *)	140 bar
Return pressure, port T (T ≤ A, B pressure) *)	140 bar
Min. inlet pressure	5 bar
Max flow	60 l/min
Min. flow	1 l/min
Pressure loss	See curve page 3
Opening time when changing direction **)	110 ms
Closing time when changing direction **)	130 ms
Leakage, port P → A, B, T	0 ml/min
Leakage, port A, B → T	0 ml/min
Leakage, port, A, B → P (inlet pressure port P = 0 bar)	max 5 ml/min
Leakage, port A, B → P (inlet pressure port P = pressure port A, B)	0 ml/min
Degree of enclosure	IP 67

*) The pressure in each of the ports P, A and B must always be higher than the pressure in port T
**) No electrical delay required when changing direction

Temperature

Storage temperature:
- -40°C to +70°C – provided that the valve is drained of fluid and stored with the ports "plugged"

Operation on (clean) water:
- Fluid temperature and ambient temperature: +3°C to +50°C

Operation on water containing antifreeze:
- Fluid temperature and ambient temperature: –30°C 1) to +50°C

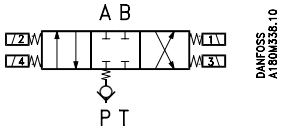
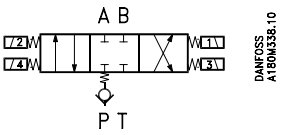
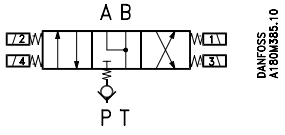
1) please see paragraph on antifreeze protection

Antifreeze Protection

If a system requires antifreeze protection, Danfoss recommends Dowcall N or Chillsafe mono propylene glycol from the Dow Chemical Company and Arco Chemical Company, respectively.
Both antifreezes are biologically degradable and must be used together with demineralized water.
Mixing ratio must be:

- min. 30% antifreeze and 70% demineralized water providing frost protection to –13°C and preventing biofilm in the system.
- max. 50% antifreeze and 50% demineralized water due to increased viscosity, providing frost protection to –30°C.

Code numbers

Valves (without coils)	Function symbol	Weight kg	Code number
VDH 60 EC - NC stainless steel, AISI 304		3.8	180L0057
VDH 60 EC - NC stainless steel, AISI 316		3,8	180L0058
VDH 60 EC - 2xNC +2xNO stainless steel, AISI 304		3,8	180L0059
Activation of valve	Electrical: 12 V d.c., 24 V d.c., 24 V a.c., 110 V a.c. , 240 V a.c. Power consumption: 18 W (d.c.), 10 W (a.c.) per coil Manual with permanent magnet		

Code numbers (continued)

The valves are supplied with screws and O-rings, but without coils.

Coil	Coils (clip-on) (NC + NO)
24 V / 50 Hz /10 W	018F7920
220 V / 50 Hz /10 W	018F7921
240 V / 50 Hz /10 W	018F7924
24 V / 60 Hz /10 W	018F7922
220 V / 60 Hz /10 W	018F7925
240 V / 60 Hz /10 W	018F7926
110 V / 50/60 Hz /10 W	018F7923
12 V d.c. / 18 W	018F7913
24 V d.c. / 18 W	018F7914

For other voltages, please contact Danfoss Sales Organisation for Water Hydraulics.
*) Requires special blocks, please contact Danfoss Sales Organisation for Water Hydraulics.
ATEX - consult the document "Solenoid valves intended for use in ATEX classified areas" 521B1101

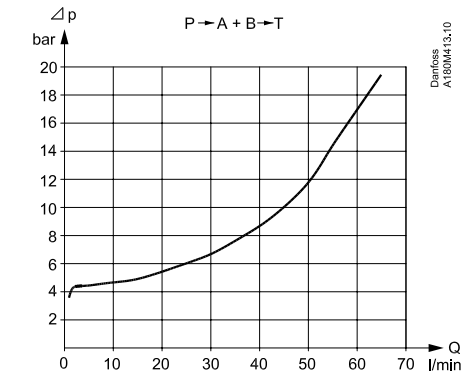
Spare parts	Code number
Poppet kit (position 8)	180L5005
Armature kit, NC (pos. 1)	180L5002
Armature kit, NO (pos. 1)	180L5010
Orifice kit	180Z0099 + 180Z0098

O-ring for mounting on block	Dimensions	Code number
NBR, 1 pc. (pos. 11)	12.00 × 2.00	633B0022

Assembly screw	Tightening torque	Code number
M6 × 45 ISO 4762 A4, 1 pc (pos. 10)	7 Nm	681X0275
Tools	**Application**	**Code number**
Special tool for orifice insert	Mounting/dismounting of orifice Orifice insert in valve housing: 12 Nm ±2 Nm Armature to be screwed into the valve housing: 60 Nm ±2 Nm	180Z0034
Spool tool included in 180L5005	Mounting of spool	
Permanent magnet	For manual activation of valve	180Z0212

For further details on coils, please see 521B0980.

Pressure losses at different flows



Available valve configurations

The table below shows the possible valve configurations, depending on which coils are activated.

For VDH 60EC 4/3 NC

Function	1	2	3	4
A B / P T	off	off	off	off
A B / P T	on	off	on	off
A B / P T	off	on	off	on
A B / P T	off	off	off	on
A B / P T	off	on	off	off
A B / P T	off	off	on	off
A B / P T	on	off	off	off
A B / P T	off	off	on	on
A B / P T	on	on	off	off
A B / P T	on	off	off	on
A B / P T	off	on	on	off
A B / P T	on	on	on	on

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Diagram showing flow routes through the valve, port lettering and coil numbers.

For VDH 60EC 4/3 NC + NO

Function	1	2	3	4
	NC	NC	NO	NO
A B / P T	off	off	on	on
A B / P T	on	off	off	on
A B / P T	off	on	on	off
A B / P T	off	off	on	off
A B / P T	off	on	on	on
A B / P T	off	off	off	on
A B / P T	on	off	on	on
A B / P T	off	off	off	off
A B / P T	on	on	on	on
A B / P T	on	off	on	off
A B / P T	off	on	off	on
A B / P T	on	on	off	off

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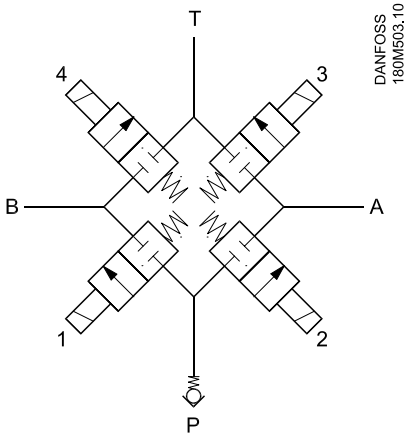
For VDH 60EC 4/3 NC



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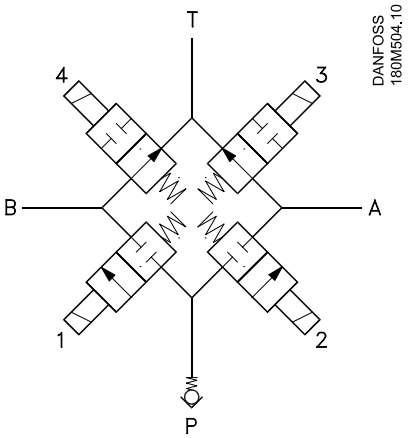
For VDH 60EC 4/3 NC + NO



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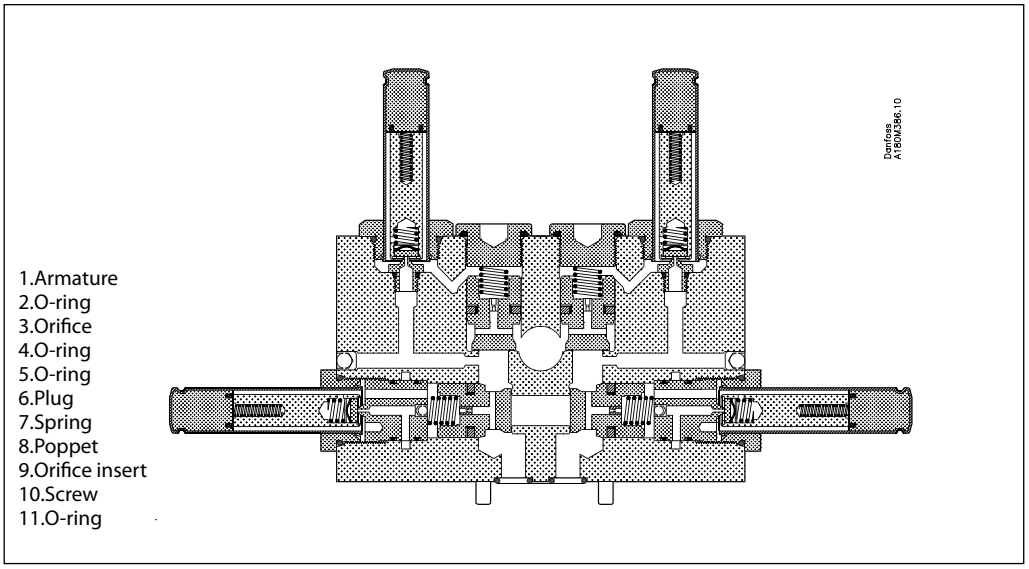
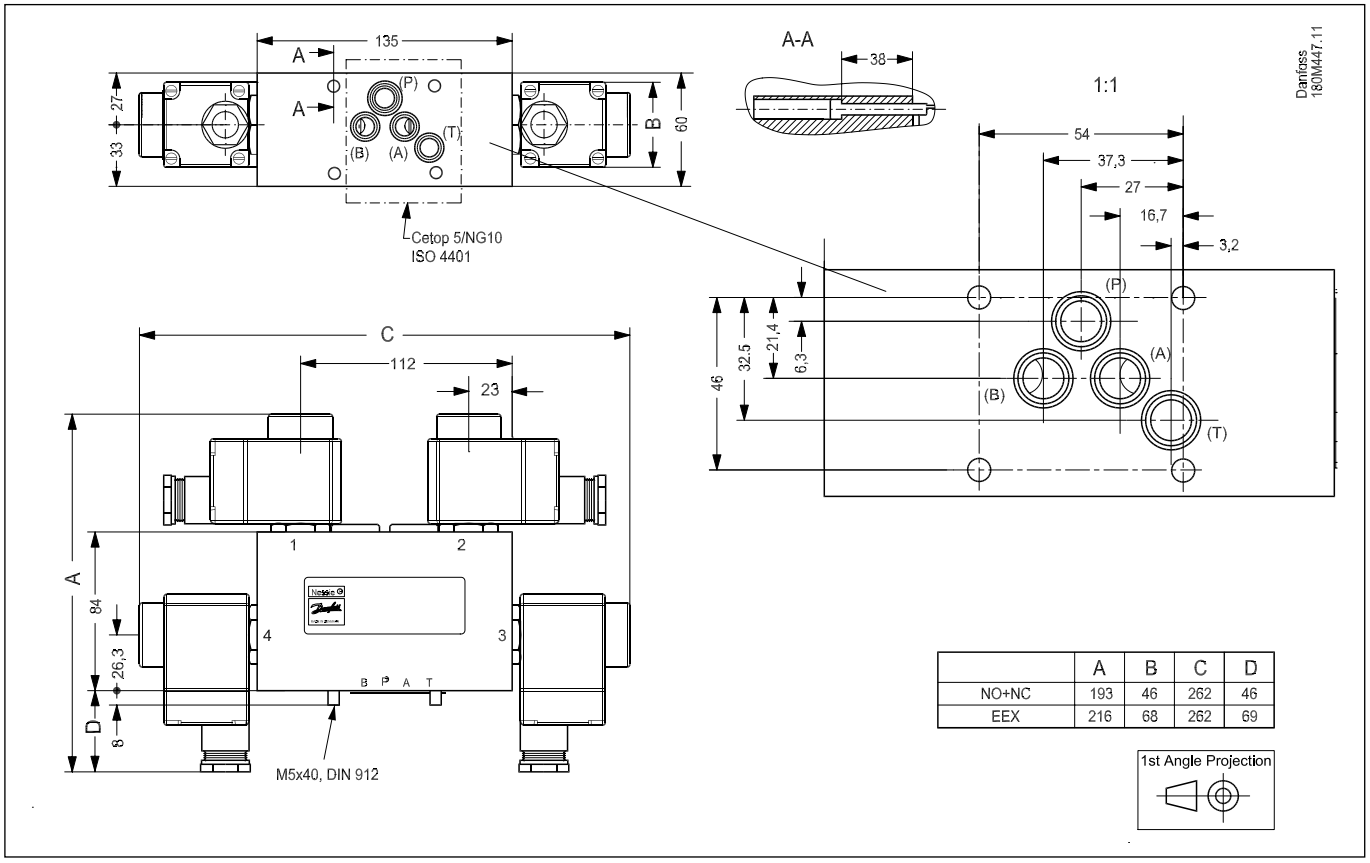
Cross-section of valve



Dimensions (mm)
VDH 60EC 4/3



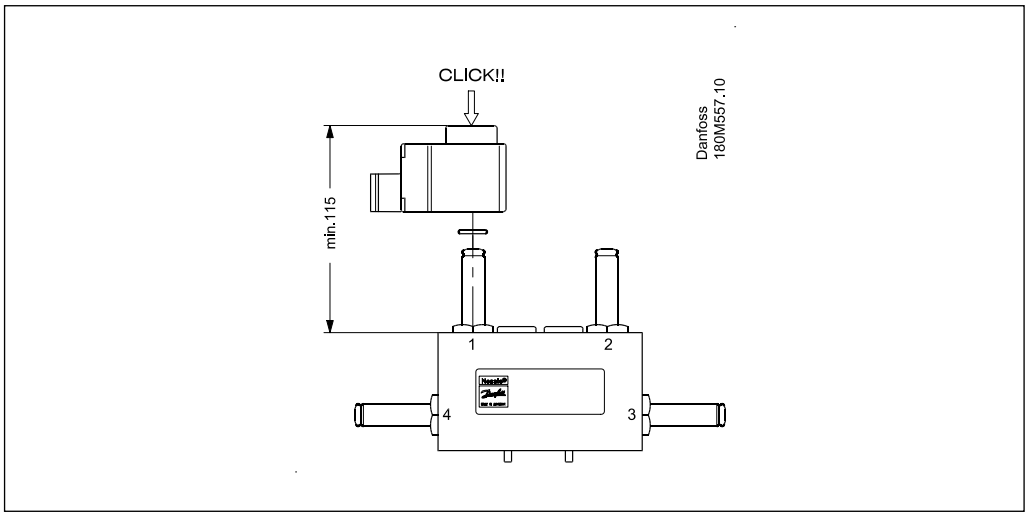
	A	B	C	D
NO+NC	193	46	262	46
EEX	216	68	262	69

Mounting of valve on cetop block

The valve is designed to be mounted on a block with CETOP 5-port connection. Four stainless steel screws and four O-rings are supplied with the valve for mounting.

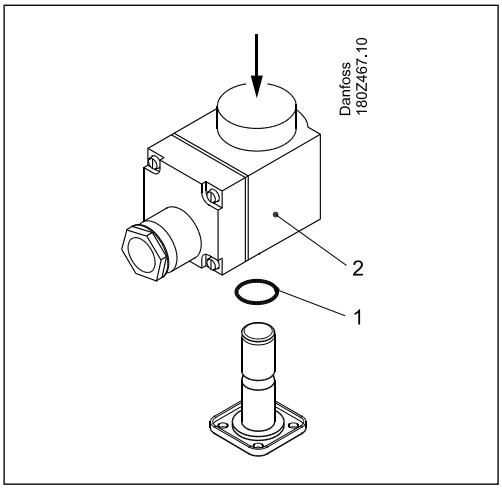
Remember to smear/spray the threads on the screws with Molykote® D pasta from Dow Corning, or Klüber UH1 84-201 from Klüber lubrication, before mounting the valve.

Mounting of coils on valve

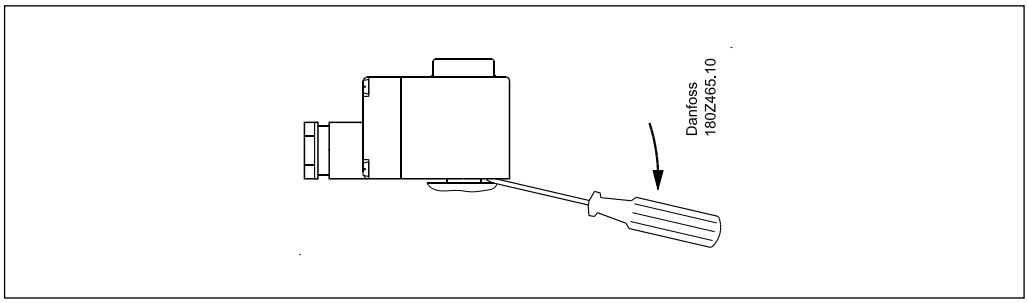


Coil on valves with short armature tubes (NC and NO valves)

1. Place the o-ring on the armature tube.
2. The coil is clicked on by means of a light pressure by hand – without using tools.



Dismounting



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